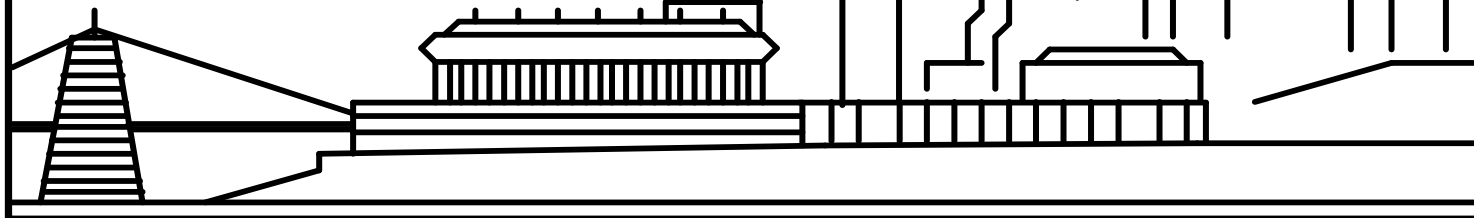




INSTITUTE OF
ELECTRICAL &
ELECTRONICS
ENGINEERS, INC.



FEBRUARY 1995

IEEE CINCINNATI SECTION NEWSLETTER

The
ENGINEERS and SCIENTISTS of CINCINNATI (ESC)
invites you to attend the
60th ANNUAL MEETING
the highlight of ENGINEERS WEEK
to be held on Thursday, February 23, 1995
at the Metropolitan Club (50 E. RiverCenter Blvd., Covington, KY)

6:00 P.M. Social Hour

7:00 P.M. Dinner: Cost \$30 - Reservation
received by 2/20/95; \$35 - after
2/20/95.

8:00 P.M. Presentation of Awards

Distinguished Engineer of Cincinnati

Mr. George Rowe
Retired, City of Cincinnati

Distinguished Scientist of Cincinnati

Dr. M. Wilson Tabor
Associate Professor
Institute of Environmental Health
UC Medical Center

Young Engineer

Mr. Douglas Keller
Projects Manager
Richard Goettle, Inc.

Young Scientist

Dr. Traci Lyn Glinsky

**Sr. Research Officer
NIOSH**

Professional Accomplishment - Academic

**Mr. Randolph Holt
Assist. Prof. & Coordinator
Electronics
Northern Kentucky University**

Professional Accomplishment - Industry/

**Consulting
Mr. James Walsh
Senior Vice President
SCS Engineers**

Professional Accomplishment - Government

**Mr. Thomas Quinn
Director, MSD Greater Cincinnati**

Community Service Award - Academic

**Mr. John Niehaus
Adjunct Associate Professor
University of Cincinnati**

Community Service Award - Industry/

**Consulting
Mr. David Lococo
Project Manager
SENCO Products, Inc.**

8:30 P.M. Speaker - A representative from NASA has been invited to be the speaker of the evening.

Contact **Dee Scott** at **(513) 385-9446** for more details. Please phone **RESERVATIONS** in by **February 20, 1995**.

Tickets will be held at the ESC reservations table at the Metropolitan Club. After calling Dee, please make reservation checks payable to ESC and mail to:

**ESC
C/O Dee Scott
PO Box 53308
Cincinnati, OH 45253**

CHAIRMAN'S MESSAGE

by Steve Olenick

The sneak preview of "Windows 95" at our January meeting was quite an eye opener. As both a MAC and Window user it was fascinating for me to see the emergence and improvement of the desktop concept in the IBM compatible world. Viewing "Windows 95" operation interactively and trying to make it fail on the spot with tens of applications running was quite a bit better than reading about it -- and a lot more fun! If you are not one of the 5,000 Beta testers, a preview copy will be on the market in February or March for about \$20 - \$30. Mass quantities of the final product will be available in the August time frame. Microsoft is planning to ship 10 to 20 million copies at a street price of about \$100. Look to upgrade to a medium range Pentium to achieve acceptable performance. For those of us EE's who tend to nurse our old PC's along, the minimum configuration appears to be a 486DX with 8M of RAM and 35 to 45M of hard drive capacity. Mr. Todd MacDonald of Microsoft was a very dynamic and informative speaker. Our appreciation and thanks extend out to Todd.

February 23 is the Engineers and Scientists of Cincinnati 60th annual meeting. Randy Holt, an Executive Committee member and Past President of our chapter will receive a Professional Accomplishment award. Congratulations, Randy!! Come join us to celebrate with him. Additional information is provided in this newsletter or call Dee Scott at 385-9446.

Mark your calendar for March 23rd. A Kodak representative from Rochester will feature a new, self-focusing camera at our technical meeting. Until next time----

ALL ELECTRONIC TELEVISION: 1935-1945

by R. J. Reiman, Historian

By 1935, the key components of all-electronic television systems were of acceptable quality, but were below today's standards. In May 1935, Sarnoff announced that RCA would spend \$1 million for the development of a complete TV system, and would transmit from the Empire State Building. Edwin Armstrong had to remove his FM antenna to make room for the TV equipment. The first transmissions occurred in 1935 with a 4 MHz VHF channel and a carrier frequency of 49.75 MHz. Initial tests were at 343 lines and 30 frames per second, and iconoscope pickup tubes were typically 5 to 10 inches, and the small size had the advantage of obscuring the system's low definition. Philco and CBS began demonstrations also, but CBS' efforts were sidetracked by unsuccessful attempts to develop a color system.

Television requires the scanning of the receiver to be synchronized within a fraction of one-millionth of a second to the optical image of the camera. This then requires standards, a FCC responsibility, to be sufficiently high, to achieve these results. RCA and Farnsworth who were ahead in technology called for immediate action by the FCC, while competitors Philco, Zenith, Dumont and CBS wanted delay to catch up. The FCC Chairman, James Lawrence Fly, concerned with RCA's potential monopoly over TV, opted for delay.

The problem in specifying a standard was in choosing the right compromise between picture quality and bandwidth. Increasing the number of lines improved the picture's sharpness, but also increased the bandwidth. Industry committees made recommendations on the TV standards, and on frequency allocations for TV, and the FCC held hearings on these. The FCC issued an order on March 19, 1939 for 19 channels below 300 MHz and reserved 19 more above 300 in the UHF range which had not been developed. These standards are still in use today. The FCC held back on TV standards and authorization of commercial broadcasting.

Sarnoff was impatient with the FCC's delays and made a move to force the licensing of TV broadcasts which could then bring in advertising money to pay for the high development costs. He announced that RCA would manufacture receivers to standards recommended by the industry committees, and would broadcast the opening

of the New York World's Fair on April 20, 1939. Under increasing pressure, the FCC authorized limited commercial broadcasting with advertising covering only the cost of programs, not operations.

Sarnoff obtained editorial support on full licensing, and the FCC in response appointed a National Television Committee to recommend TV standards. The committee, headed by W. R. G. Baker of GE, recommended a standard of 525 scanning lines and a frame rate of 30 seconds, and in April, the FCC adopted these.

World War II created a shortage of parts and technicians, but money to develop the image orthicon, which would be used to pilot bombers in precision bombing, would advance the art. The orthicon is basically a photoemissive tube in which the signal is derived from the emission of electrons from a surface on which an optical image of the scene is formed. Further progress in TV broadcasting would await the end of the war in 1945.

MATHCOUNTS VOLUNTEERS ARE NEEDED

Volunteers are needed to set up, score, supervise, serve refreshments, take photographs and direct students at the Cincinnati MATHCOUNTS competition on Saturday, February 25, 1995. Spend the morning at UC's Zimmer auditorium helping 200 local students who are psyched on school.

There are 26 local junior high schools participating in MATHCOUNTS '95. It is amazing to see junior high school students get excited to come in early on a cold Saturday morning to take the MATHCOUNTS examinations. It will renew your faith in this next generation to see their enthusiasm. Come join us ... it's contagious!! **To volunteer, call John Molander 627-7445 (Work) or 791-6529 (Home).**

ORBITAL MECHANICS SEMINAR

WASHINGTON, D.C., Dec. 30, 1994 -- "At this moment, more than 7,000 man-made objects are zooming around the earth like a menacing swarm of killer bees." That startling observation was made by Tom Logsdon, an internationally-recognized expert in orbital mechanics and the industrialization of space. "If any one of those 7,000 objects happens to collide with the Space Station, the results could be catastrophic -- with an energy release rivaling the explosion of an equivalent amount of TNT" Logsdon said.

The hazardous nature of space debris is a key topic in Logsdon's three-day seminar on the many intriguing aspects of orbital mechanics. He has scheduled his ORBITAL MECHANICS: THEORY AND APPLICATIONS SEMINAR for Tuesday - Thursday, February 7-9, 1995, at the Holiday Inn, Middleburg Heights, OH (Cleveland, OH area).

During his seminar, which was expressly developed for today's aerospace managers and engineers, Logsdon reviews various ways to minimize the hazard by careful orbital-altitude selection, bilateral agreements and through the controlled deorbit of spent stages, payload shrouds and dead satellites that no longer perform a useful function. In one unique concept, which Logsdon developed for Rockwell International, ground-based lasers pointing straight up toward the sky illuminate useless fragments to push them out of orbit.

"It may seem strange," Logsdon observed, "but pushing straight up on an orbiting fragment causes it to fall down toward the ground. The Apollo astronauts used a similar approach when they flew their landing craft down toward the surface of the moon."

Logsdon has calculated that, "the energy required to push the average space debris fragment out of orbit with a ground-based laser costs only about \$40,000, even at the retail price of the electricity as delivered to our homes.

For only \$380 million worth of electrical power we could virtually eliminate the collision hazard from space debris."

In addition to the deorbiting of space debris, Logsdon covers launch vehicles, design, optimal boost trajectories, rendezvous maneuvers, planetary swingbys and a variety of clever performance-enhancement techniques in his seminar. Included also is a discussion of the Russian Glosnass and futuristic concepts for the 21st century.

Persons interested in the Orbital Mechanics seminar should contact Applied Technology Institute, 12960 Linden Church Road, Clarksville, MD 21029. Tel. (410) 531-6034, Fax (410) 531-1013.

Logsdon has worked as a professional rocket scientist in the American space program for over 30 years. During his early career, he helped shape the boost trajectories for the Echo Balloon and he optimized the powered-flight maneuvers for the Apollo moon flights. He also handled orbital mechanics simulations and rendezvous studies for Project Skylab, and helped select the best constellation for America's 24-satellite Navstar Global Positioning System (GPS).

For the past 13 years, Logsdon has been teaching scientists and engineers in different parts of the world about the subtle nuances of America's quest toward industrializing the space frontier. During this time, he has lectured on orbital mechanics and space industrialization in 17 different countries on five continents.

Logsdon has written and published 1.2 million words including 40 technical papers and 26 non-fiction books. His most recent book, "Mobile Communication Satellites," which will be published by McGraw Hill in January, 1995, describes how orbiting satellites will soon relay cellular telephone calls between people all over the world.

His seminar has been previously sponsored by NASA's Johnson Space Flight Center, Houston, TX, White Sands Missile Base, NM, Johns Hopkins University, Baltimore, MD, Oxford University, England, the University of Sydney, Australia, Houwteq Corporation, Capetown, South Africa and Technology Training, Tel Aviv, Israel.

The Orbital Mechanics Seminar is also scheduled for March 7-9, 1995 at the Holiday Inn, Los Angeles International Airport, CA.

IEEE NEWS

NATIONAL ENGINEERS WEEK TO HONOR CREATOR OF MAGNETIC TAPE RECORDING

WASHINGTON, Dec. 1 -- You won't likely see Marvin Camras on the evening news. Nor will you hear his voice booming from the stereo. Chances are, you're not even going to spot his name on the credit card on an American Express commercial. Camras is no media superstar, yet he is the man who made possible today's \$5 billion electronic communications industry. That's because he developed magnetic tape recording -- the technology behind audio cassettes, videotape, computer floppy disks and even credit card magnetic strips.

Camras, a Life Fellow of IEEE is one of thousands of engineering pioneers to be honored during National Engineers Week for their positive contributions to American lifestyles. "The Engineering of Everyday Life" is a theme of National Engineers Week, February 19-25, 1995, selected to draw attention to the myriad aspects of contemporary living which resulted from the often-anonymous work of engineers.

Camras, now 78, developed an interest in electronics while still a youngster growing up in Chicago. At age 18, to help his cousin practice singing, he first recorded sound on magnetically-charged piano wires. Shortly

thereafter, Camras discovered that using magnetic tape eased the work of slicing and storing the recordings. His patent on the process was licensed to General Electric in the mid-1930's, and within a few years 130 companies around the globe were using his inventions to manufacture recording devices.

Camras studied engineering at what is now the Illinois Institute of Technology, where he is still on the faculty as a research professor. While an undergraduate, he was invited by his professors to refine his discoveries on the staff of the school's research foundation.

During World War II, Camras pursued military applications of the magnetic recorder, developing the famed "Model 50," a portable machine that the Allies used to play recorded, amplified battle sounds at decoy locations during the Normandy Invasion. His wartime patents of a ferric oxide magnetic tape and a method for reducing noise and distortion by using high-frequency bias are still standards in consumer tape recorders today.

In 1950, Camras unveiled a prototype video-tape recorder, which led to the widespread use of video tape, the end of live television, and the eventual development of the videocassette recorder now found in most American homes. To date, he has received more than 500 patents, which have been licensed to over 100 manufacturers worldwide. Among his many honors, he was inducted into the Inventors Hall of Fame in 1985, and received the National Medal of Technology in 1990.

He lives today with his family in a solar-powered house he mostly built himself, where he pursues his avocation of crafting high-quality violins and violas -- one of which is used by his son-in-law, head of the Chicago Symphony Orchestra's viola section. His son is an electronic engineer with Hewlett Packard.

The IEEE, through its United States Activities division (IEEE-USA), is one of more than 50 organizations sponsoring National Engineers Week 1995. The week involves tens of thousands of engineers in activities designed to increase awareness and appreciation of the engineering profession.

UNEMPLOYED ENGINEERS STRUGGLE WITH CHANGING RULES IN JOB MARKET

WASHINGTON, Dec. 1 -- Unemployed engineers in the United States are finding that some cherished assumptions about today's world of work are proving to be unfounded myths, according to a cover story in the November issue of IEEE Spectrum magazine. "Engineering Layoffs: Facts and Myths," by Senior Editor Trudy E. Bell, uses case studies of U.S. engineers and findings in recent publications to argue that following the current wisdom may be insufficient to protect engineers' careers in a changing world. The article recommends that engineers improve their prospects by taking advantage of new resources, including employment assistance services provided by the United States Activities division of IEEE (IEEE-USA).

The Spectrum article documents several assumptions as either "myths" or "facts," each supported by profiles of laid-off engineers.

Listed as myths:

- being at the cutting edge of technology makes an engineer desirable;
- having many talents will set an engineer apart from the crowd;
- skills learned in defense work can be easily converted to civilian use; and
- continuing education or re-education will keep an engineer employable.

Recorded as facts:

- salaries of full-time engineers are falling;
- some survival strategies may threaten a company's "technical vitality";
- demand for temporary engineers is booming and compensation is high;

- some observers suggest the full-time job is disappearing; and
- more than technical skills are needed to find work today.

Many of the qualities outlined as myths are central to commonly believed theories of technical vitality. The case studies portray professionals who were exemplary in doing the "right things," yet found themselves out of work, and -- in many cases -- unable to obtain satisfactory new jobs.

Spectrum cites new books such as William Bridges' "JobShift: How to Prosper in a Workplace Without Jobs" to suggest that revolutionary changes in technology and the organization of work are to blame for making the old rules obsolete. Some new thinkers argue that in the new workplace engineers should think of themselves not as employees, but as contractors who have the skills, independence and versatility to move from job to job -- even within the same company.

The article recommends that engineers enhance their future marketability by considering the acquisition of a professional engineer (P.E.) license; honing communications skills; and taking responsibility for things -- such as benefits -- that they used to leave up to their company. Spectrum cites IEEE-USA's "Employment Guide for Engineers and Scientists," among other publications, as a resource for laid-off engineers.

U.S. IEEE Members should also take advantage of several recently-introduced IEEE-USA employment assistance services when seeking new work. Membership in the Alliance of IEEE Consultants' Networks (AICN) helps provide engineers the tools to succeed in the rapidly-growing consulting field. The new IEEE-USA National Job-Listing Service gives members access to engineering jobs posted on the Internet. And IEEE-USA's contract with Job Bank USA offers inexpensive resume referral to a large, national client base of employers. IEEE members are also eligible for a special discount on most services at Kinko's. For additional information about IEEE-USA's employment assistance services, contact IEEE-USA's William R. Anderson at 202-785-0017.

IEEE MEMBERS TO EARN BONUS MILES WITH FINANCIAL ADVANTAGE TRAVELER MILES PROGRAM

PISCATAWAY, N.J., Jan. 10 -- The IEEE is offering a new frequent-flyer program, called *TravelerMiles*, through the IEEE Financial Advantage Program. *TravelerMiles* lets IEEE members spend and earn at the same time by charging purchases with an IEEE Visa Gold or Gold MasterCard issued by Travelers Bank, formerly Primerica Bank.

For every dollar in purchases made with the IEEE Visa Gold or Gold MasterCard, IEEE members will earn one mileage point toward flights originating in the U.S. Members can also transfer balances from other credit cards and receive one mileage point for every dollar transferred.

The mileage redemption requirement for *TravelerMiles* is approximately 5,000 miles lower than other frequent-flyer programs. Members only need 20,000 miles to receive a free airline ticket when flying in the same time zone. When flying to a different time zone or abroad, required mileage points are slightly higher. The annual fee for the *TravelerMiles* Program is \$75. However, when members spend at least \$3,000 on their IEEE-endorsed Travelers (formerly Primerica) account through the IEEE Travel Service within one year, they will be credited the \$75 fee.

IEEE members who sign up for *TravelerMiles* will receive valuable coupons for upgrades and discounts on airlines, hotels and car rentals, which can also be exchanged through the IEEE Travel Service.

To apply for an IEEE Visa or MasterCard, or if you already have an IEEE-endorsed credit card account and want to sign up for the *TravelerMiles*, call 1-800-772-2221.

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FEBRUARY 1995

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